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IS 15275 (2003): Padlocks [MED 33: Utensils, Cutlery and Domestic Hardware]

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IS 15275 : 2003
(Superseding IS 275; IS 1018;
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भारतीय मानक

ताले — विशिष्टि

Indian Standard

PADLOCKS — SPECIFICATION

ICS 91.190

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

April 2003

Price Group 5

Utensils, Cutlery and Domestic Hardware Sectional Committee, ME 33

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Utensils, Cutlery and Domestic Hardware Sectional Committee had been approved by the Mechanical Engineering Division Council.

The following Indian Standards covering requirements of various locks/padlocks have been published by this committee:

IS No.	*Title*
275 : 1982	Padlocks lever type, hand made
1018 : 1982	Padlocks brass, lever type, machine made
4230 : 1967	Locks, lever tumbler type
4231 : 1967	Locks, miller type
12197 : 1987	Padlocks, pin tumbler type

The Committee while reviewing these standards decided that all the above standards be merged together so as to formulate the composite standard to make it more user friendly.

All the above standards would be withdrawn after publication of this standard.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PADLOCKS — SPECIFICATION

1 SCOPE

This standard lays down material, principal dimensions, requirements and tests for various types of padlocks.

2 REFERENCES

The Indian Standards given in Annex A are necessary adjuncts to this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in the Annex A.

3 TERMINOLOGY

For the purpose of this standard, the following definitions and terminology shall apply.

3.1 Terms Related to Padlocks

3.1.1 *Padlock*

A detachable and portable lock usually for use with hasps and staples, having a hinged or sliding shackle to pass through a staple eye or similar device fixed to the door. The shackle is locked into and released from the case of the padlocks by the key operated bolt.

3.1.2 *Chain Padlock*

Any padlock having permanently attached to it, either:

a) One end of a length of a stout chain for passing round and securing, for example, two stiles of a gate, or
b) One end of a length of a light safety chain to prevent the padlock from being removed or mislaid.

3.1.3 *Close Shackle Padlock*

A padlock having minimum amount of shackle visible when secured so as to fit snugly over hasp or locking bar to increase the difficulty of cutting the shackle or forcing it open by an implement.

3.1.4 *Shackle*

The hinged or sliding part of a padlock which passes through the staple, loop or other device on the door.

3.1.5 *Spring Shackle Padlock*

A padlock in which the shackle springs open when the key is turned and which usually incorporates a shackle bolt under pressure of second spring so that the shackle becomes locked without the use of a key pushed into the closed position.

3.1.6 *Extended Shackle Padlock*

A shackle that is longer than the case normally found on padlocks.

3.1.7 *Individually Keyed*

Descriptive of a padlock that can be opened by means of a specific key only.

3.1.8 *Key Combinations*

The way in which the sets of levers/tumblers in the lock mechanism of a padlock are arranged in order to give each padlock its own individual set of keyway steps.

3.1.9 *Keyed Alike* (*Common Key Arrangement*)

Descriptive of padlocks that can all be opened by means of a single key but that key is not a master key.

3.1.10 *Key Variations*

The different sets of combinations that can exist without duplication.

3.1.11 *Master Key*

A key manufactured in such a way that it opens a set of locks that are all identically master keyed.

3.1.12 *Nominal Size*

The overall width or diameter of a padlock at its widest part.

3.2 Terms Related to Disc Tumbler Padlock

3.2.1 *Disc Tumbler Padlock*

Any padlock having a disc tumbler mechanism.

3.2.2 *Disc Tumbler*

A movable detainer in the form of a shaped flat plate, pierced with a slot through which the key passes.

3.2.3 *Disc Tumbler Mechanism*

A lock mechanism having a cylindrical plug rotating in a body and having, as its principal feature, movable detainers in the form of flat plates (disc tumblers) sliding, generally under spring pressure, in transverse slots in plug. The disc tumblers project from one end or the other of the slots except when correctly aligned by the key. When secured, the projecting tumblers engage in two or sometimes four diametrically opposite longitudinal grooves in the sides of plug hole and thus prevent the plug from turning.

3.2.4 *Disc Tumbler Key*

A bulleted (profiled) key which is flat and has a long bit, or blade, in which '*V*' cuts are made on one or both edges to operate the tumblers in a disc tumbler padlock.

3.2.5 *Double Bitted Key*

A double bitted key is one, which has '*V*' cuts on both edges of the blade. It may be of following types:

a) Double bitted key with reversible key entry (with '*V*' cuts on both edges, which are symmetrical); and
b) Double bitted key with irreversible key entry (with asymmetrical '*V*' cuts on both the edges).

3.2.6 *Single Bitted Key*

A single bitted key is one, which has '*V*' cuts on one of the edges of the blade.

3.2.7 *Plug (Rotor)*

The part of the disc tumbler padlock into which the key enters and turns.

3.3 Terms Related to Pin Tumbler Padlock

3.3.1 *Pin*

The lower of two small solid metal cylinders which together form one of the set of movable detainers in a pin tumbler lock.

3.3.2 *Pin Tumbler*

A movable detainer consisting of a pin and a detainer.

3.3.3 *Pin Tumbler Mechanism*

A locking mechanism having a plug rotating in a body and as its principal feature, movable detainers in the form of pairs of pin tumblers (operating and driver pins) fitting, together with their springs, in holes in the plug and body. In the secured position the drivers bridge interface between the body and plug thus preventing the plug from turning.

The keyway is an axial radial slot in the plug. Insertion of the correct key lifts the pins and driver against their springs and positions them so that the joint façes between the pin and driver lie on the interface between the plug and body thus permitting the plug to turn.

3.3.4 *Driver*

The upper of two small solid metal cylinders, which together form one of the set of movable detainers in a pin tumbler lock.

3.3.5 *Locking Bolt or Shackle Locking Balls*

The bolt or locking balls within the body of the padlock, which engages with the notch in the shackle when locked. In some padlocks there are two locking bolts or locking balls.

3.3.6 *Profiled Pin Tumbler Key*

A bulleted (profiled) key which is flat and has a long bit, or blade in which '*V*' cuts are made on one or more edges to operate the tumblers in a pin tumbler lock.

3.3.7 *Key with Indents*

3.3.7.1 Key with indents is one, which has blind indents on each side of the blade, and/or each side of the edge.

3.3.7.2 A key with indents is generally of the following types:

a) Reversible key entry (with indents on both sides and edges, which are symmetrical). It may or may not be profiled.
b) A key with indents may operate two or more number of rows of pins as desired.

3.3.8 *Single Bitted Key*

A single bitted key is one, which has '*V*' cuts on one of the edges of the blade.

3.3.9 *Plug (Rotor)*

The part of the pin tumbler padlock into which the key enters and turns.

3.3.10 *Paracentric Keyway*

A keyway that has longitudinal ribs and grooves that project beyond its centre to resist lock picking.

3.4 Terms Related to Lever Padlock

3.4.1 *Lever Padlocks*

Any padlock having as its principal feature a lever mechanism for operating the lock.

3.4.2 *Lever*

A flat movable detainer pivoted at one end or sliding guide and perforated by a shaped slot or gating which in the secured position prevents axial/angular movement/rotation of the bolt of the lock but which, when lifted by its initial contact with a rotating key bit allows the bolt stump to pass through the gating thus enabling the bolt to be thrown or withdrawn and then falls back to the secured position as the key passes out of contact.

3.4.3 *Lever Mechanism*

A lock mechanism having as its principal features, one or more levers to work as detainers.

3.4.4 *Bit Key*

A type of key in which the bit projects from the shank at right angles.

3.4.5 *Single Bitted Key*

A single bitted key is one which has a bit on one side of the shank (flat/round) and square cuts are made on bit to operate the mechanism.

3.4.6 *Double Bitted Key*

A double bitted key is one which has bits on both the sides of the shank (flat/round) and square cuts are made on the bits to operate the lever mechanism.

4 SIZES AND GRADES OF PADLOCKS

The recommended sizes of Disc Tumbler Padlocks (DTP), Lever Padlocks (LP) and Pin Tumbler Padlocks (PTP) are given in Table 1.

Padlocks having sizes other than those specified in Table 1 may also be permitted as agreed to between the purchaser and the supplier, but the other provisions in this standard will be generally adhered to. Recommended grades of padlocks are given in Table 2.

Table 1 Dimensions of Lock and Shackle

(*Clause* 4)

Sl No.	Nominal Size of Lock mm	Minimum Shackle Diameter mm
(1)	(2)	(3)
i)	25	4
ii)	30	4
iii)	40	5
iv)	45	6
v)	50	6
vi)	55	8
vii)	60	8
viii)	65	9
ix)	70	10
x)	75	11
xi)	85	12
xii)	90	12

Table 2 Size and Grades of Padlocks

(*Clause* 4)

Sl No.	Details of Lock	Grade I			Grade II			Grade III			Grade IV			Grade V		
		DPT	LP	PTP	DPT	LP	PTP	DPT	LP	PTP	DPT	LP	PTP	DPT	LP	PTP
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
i)	No. of levers/ tumblers, *Min*	4	4	4	4	5	5	5	6	5	5	7	6	6	8	8
ii)	Key combinations, *Min*	50	75	75	50	300	300	100	1 200	300	100	5 000	1 200	200	20 000	20 000
iii)	Single locking bolt	+	+	+	+	+	+	–	–	–	–	–	–	–	–	–
iv)	Double locking bolt	–	–	–	–	–	–	+	+	+	+	+	+	+	+	+
v)	Anti-picking pins	–	–	–	–	–	–	–	–	+	+	+	+	+	+	+
vi)	Close shackle padlock	–	–	–	–	–	–	–	–	–	–	–	–	+	+	+
vii)	Key not removable	Optional			Optional			Optional			Optional			+	+	+
viii)	Hardened shackles	Optional			Optional			Optional			Optional			+	+	+

+ Applicable
– Not applicable
DTP = Disc tumbler padlock
LP = Lever padlock
PTP = Pin tumbler padlock

5 SHAPE

The typical shape and design of padlocks and their parts indicated in Fig.1, 2 and 3 are intended to be illustrative and for guidance only. Other shapes and designs may also be made as per manufacturer's patent or as agreed to between the purchaser and the supplier.

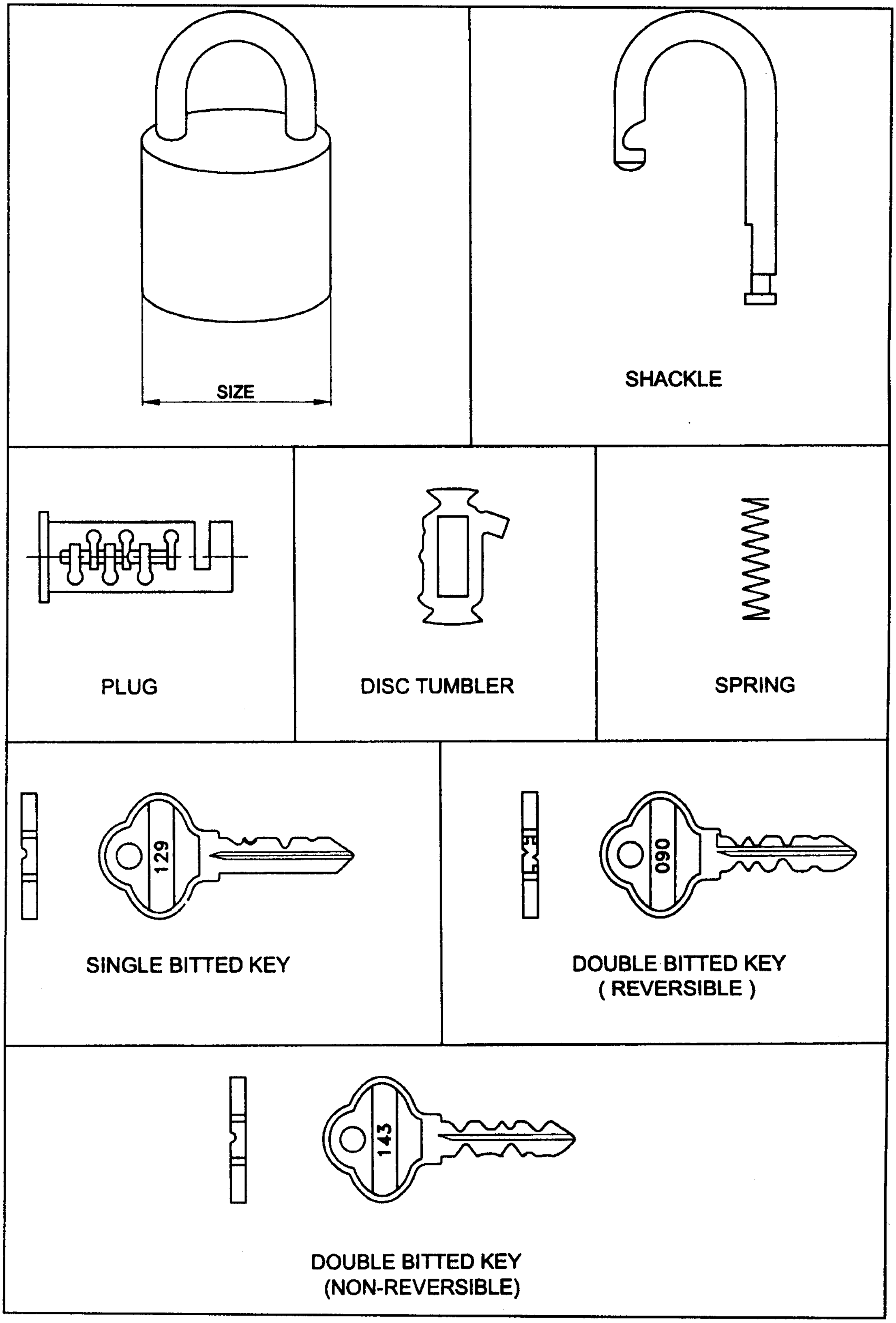


FIG.1 DISC TUMBLER PADLOCK

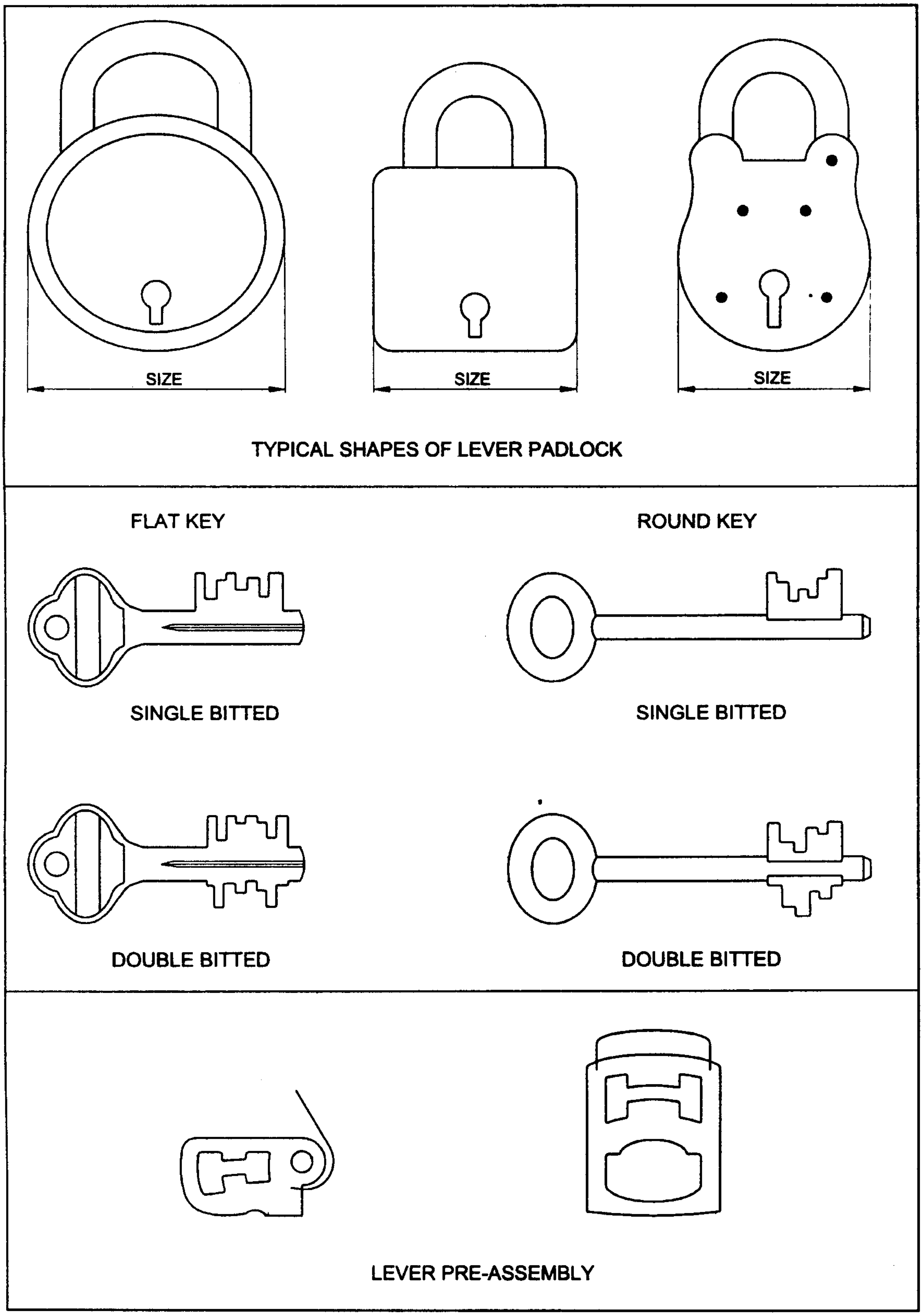
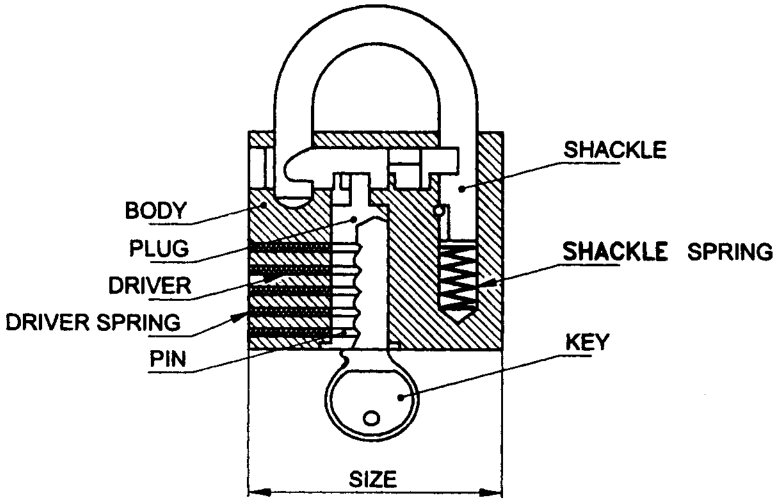
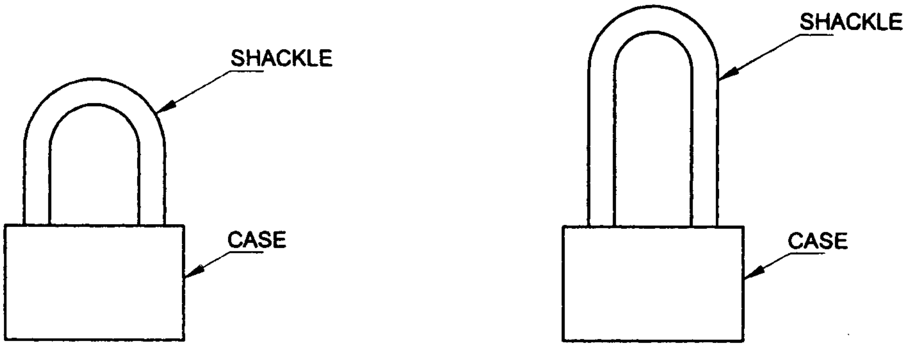


FIG. 2 LEVER PADLOCK

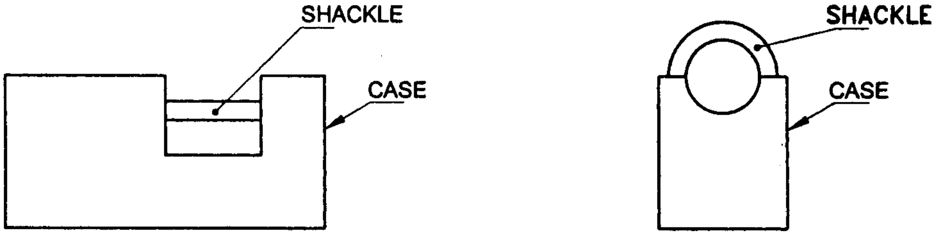


CROSS-SECTION OF A PADLOCK



NORMAL SHACKLE

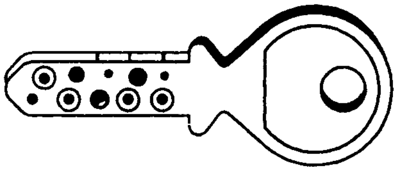
EXTENDED SHACKLE



CLOSED SHACKLE

CLOSED SHACKLE (CLOSE-SET)

EXAMPLES OF DIFFERENT SHACKLES FOUND ON PADLOCKS



KEY WITH INDENTS

FIG. 3 PIN TUMBLER PADLOCK

6 MATERIAL

The components of the various types of padlocks shall be manufactured from the recommended materials in Tables 3, 4, 5 and 6 and the manufacturer may select suitable materials for the manufacture of padlock. However the assembled lock shall meet the functional requirements as given in Table 7.

Table 3 Recommended Materials for Various Components of Padlocks (In General)

(*Clause* 6)

Sl No.	Component	Recommended Material	Related Indian Standards and Grades
(1)	(2)	(3)	(4)
i)	Key	Brass sheet	IS 410, Alloy CuZn40
		or	
		Steel sheet	IS 513
		or	
		Stainless steel	IS 6911
		or	
		Nickel silver	IS 2283
ii)	Spring	Spring steel wire	Any suitable grade IS 4454 (Part 1)
			or
		or	IS 4454 (Part 2)
			or
			IS 4454 (Part 4)
		Phosphor bronze wire	IS 7608, Grade III
iii)	Shackle	Bright bars	IS 9550
		or	
		Stainless steel bars and flats	IS 6603
		or	
		Stainless steel wire rod	IS 6527
iv)	Case/Body	Steel sheet	IS 513
		or	
		Stainless steel sheet	IS 6911
		or	
		Brass sheet	IS 410

Table 4 Recommended Materials for Various Components of Disc Tumbler Padlock

(*Clause* 6)

Sl No.	Component	Recommended Material	Related Indian Standards and Grades
(1)	(2)	(3)	(4)
i)	Body and plug	Zinc base alloy Die castings	IS 742, Alloy 2, Table 1
		or	
		Aluminum alloy	IS 617, Alloy A6
		or	
		Leaded brass	IS 292, Grade III
		or	
		Nylon, delrin, Polycarbonate	Engineering Plastics
		or	
		Free cutting leaded brass	IS 319
ii)	Disc tumbler	Brass sheet	IS 410, Alloy CuZn40
		or	
		Steel sheet	IS 513
		or	
		Aluminum alloy	IS 737, Alloy NS-4

Table 5 Recommended Materials for Various Components of Pin Tumbler Padlock

(*Clause* 6)

Sl No.	Component	Recommended Material	Related Indian Standards and Grades
(1)	(2)	(3)	(4)
i)	Body and plug	Zinc base alloy die castings	IS 742, Alloy 2, Table 1
		or	
		Aluminium alloy	IS 617, Alloy A6
		or	
		Brass gravity die casting	IS 1264, Grade III
		or	
		Free cutting leaded brass	IS 319
ii)	Cylinder	Zinc base alloy die castings	IS 742, Alloy 2, Table 1
		or	
		Brass gravity die casting	IS 1264
		or	
		Brass rod	IS 4170
iii)	Pin tumbler	Brass wire	IS 2704
		or	
		Nickel silver rods	IS 10757

Table 6 Recommended Materials for Various Components of Lever Padlock

(*Clause* 6)

Sl No.	Component	Recommended Material	Related Indian Standards and Grades
(1)	(2)	(3)	(4)
i)	Body and plug	Zinc base alloy die castings	IS 742, Alloy 2, Table 1
		or	
		Aluminium alloy	IS 617, Alloy A6
		or	
		Leaded brass	IS 292, Grade III
		or	
		Nylon, delrin, polycarbonate, etc	Engineering plastics
		or	
		Brass sheet	IS 410, Alloy CuZn40
ii)	Lever	Brass sheet	IS 410, Alloy CuZn40
		or	
		Steel sheet	IS 513
		or	
		Aluminium alloy sheet	IS 737, Alloy NS 4
iii)	Rivet	Mild steel wire	IS 280

7 GENERAL

7.1 Cases

Cases shall be solid, laminated or formed as required.

7.1.1 *Solid Case*

A solid case shall be made in one piece and the only openings shall be for inserting the shackle and the lock mechanism and if necessary, for drainage. The diameter of a drainage hole shall not exceed 3 mm. Any other openings required during the assembly of the padlock shall be individually plugged by riveting or pressing (or both).

7.1.2 *Laminated Case*

A laminated case shall be assembled from metal laminates that, if not of inherently corrosion-resistant metal, are individually plated before assembly. All laminates shall be so riveted or brazed as to render the case substantially solid and such that it will not be possible to dismantle the padlock by filing off the rivet heads.

7.1.3 *Formed Case*

A formed case shall consist of shaped metal plates covering the internal assemblies so as to offer sufficient levels of security.

7.2 Shackles

7.2.1 A shackle shall be of the closed, normal or extended type as required.

7.2.2 *Hardness of Shackles*

The surfaces of shackles shall be case hardened and the hardness shall be in the range of 88 to 92 HRB. The depth of case hardness shall be as follows:

Dia of Shackle mm	*Depth of Hardness* mm
4 to 5	0.15 to 0.25
6 to 10	0.30 to 0.45
Above 10	0.50 to 0.80

8 WORKMANSHIP AND FINISH

8.1 The method of manufacturing of padlocks and its components is left to the manufacturer, however, it shall meet the requirements laid down in this standard.

8.2 All components of the padlocks and keys shall be finished smooth to minimize frictional resistance in their working.

8.3 The body of the padlock, if required, shall be suitably painted/plated. The shackle and keys for brass padlocks shall, however be finished bright.

8.4 Steel components shall be suitably protected to resist corrosion. The electroplated coating of nickel plus chromium, zinc on iron and steel or brass plating wherever specified, shall be done in accordance with Grade C of IS 1068, Grade B of IS 1573 and Class A of IS 1773 respectively. The electroplated coating of copper plus nickel plus chromium shall be done in accordance with IS 1068.

9 SAMPLING AND INSPECTION

9.1 Sampling

9.1.1 *Lot*

In any consignment, all the locks of the same type, same size, and manufactured from the similar materials under similar conditions of manufacture shall be grouped together to constitute a lot.

9.1.1.1 For ascertaining the conformity of the lot to the requirements of this standard, the sample of padlocks shall be and tested separately for each lot.

9.2 The number of sample locks to be selected at random from a lot shall depend upon the size of the lot and shall be in accordance with Table 7.

9.2.1 The padlocks in the samples shall be selected at random from the lot. In order to ensure the randomness of selection, procedures given in IS 4905 may be followed.

9.2.1.1 In case padlocks are packed in boxes, 20 percent of the boxes, subject to a minimum of two, shall be opened and equal number of padlocks shall be taken from each box so as to constitute the required sample size.

9.3 Number of Tests and Criteria for Conformity

9.3.1 *For Dimensions, Workmanship and Finish*

The padlocks selected according to **9.2** shall be inspected for dimensions, workmanship and finish. The lot shall be considered as conforming these requirements if the number of padlocks failing in any one or more of the requirements does not exceed the permissible number of defective padlocks given in Table 7.

9.3.2 *For Load Test and Soundness Test*

From the lot found conforming under **9.3.1** a sub-sample shall be drawn in accordance with Table 7 and tested for load test and soundness test consecutively. The lot shall be considered as conforming to the requirement of load and soundness test if the number of sample padlocks failing in any of the two tests does not exceed the permissible number of defective padlocks.

10 TESTS

10.1 Non-interchangeability Test

For the purpose of testing non-interchangeability, the manufacturer shall present the padlocks of each size in batches for non-interchangeability test for that size or part thereof, 15 in case of sizes up to 40 mm and 22 in case of higher sizes of padlocks shall be selected in

Table 7 Sample Size and Criteria for Conformity

(*Clauses* 6, 9.2, 9.3.1 *and* 9.3.2)

Sl No.	Lot Size (No. of Locks in the Lot)	Dimensions, Workmanship and Finish		Load Test and Soundness Test	
		Sample Size	Permissible No. of Defective Padlocks	Sub-sample	Permissible No. of Defective Locks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Up to 50	8	0	2	0
ii)	51 to 150	13	0	2	0
iii)	151 to 300	20	0	2	0
iv)	301 to 500	32	1	3	0
v)	501 to 1 000	50	2	5	0
vi)	1 001 to 3 000	80	3	10	0
vii)	3 001 to 10 000	125	5	15	1
viii)	10 001 and above	200	7	20	2

such a manner that the arrangement of the wards of their keys is nearly similar, that is, the ward of the keys differ from each other slightly. The padlocks with their keys so selected shall be tested for non-interchangeability by using each key with all other padlocks. If none of the keys works or opens any other padlock then the batch from which the padlocks have been selected shall be considered to have passed the non-interchangeability test.

10.2 Soundness Test

Each padlock in the locked condition shall be firmly held in hand by the shackle and five sharp blows from height of 600 mm shall be given on a 75 mm thick lead block with that side of the padlock on which the shackle is riveted. The padlock shall then be opened and the above test is repeated by striking five sharp blows on the opposite side of the padlock. During or on completion of the test the padlock shall not open or show any sign of damage or defective functioning.

10.3 Load Test

The body of the sample padlock shall be held in the clamping jaws in the locked condition with shackle engaged in a suitable hook or eye in a vertical position. The tensile load as mentioned below shall be gradually applied to the padlock through the hook without jerks and maintain the force for 1 min. The padlock shall not fail under the load.

Nominal Size of Lock mm	*Minimum Shackle Diameter* mm	*Tensile Load* kgf
25	4	75
30	4	75
40	5	150
45	6	200
50	6	200
55	8	400
60	8	400
65	9	500
70	10	600
75	11	800
85	12	900
90	12	900

11 MARKING

11.1 Each padlock shall be marked with the following information:

a) Manufacturer's name or initials or trade-mark,
b) Year of supply (if specified by the purchaser),
c) Number of levers,
d) Size of the padlock, and
e) Serial number of padlock.

11.2 BIS Certification Marking

Each padlock may also be marked with the Standard Mark.

11.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

11.3 The key shall be stamped on the head with the serial number of the padlock.

12 PACKING

Each padlock with its keys shall be packed in a moisture proof paper or polyethylene bag, or as agreed to between the purchaser and the supplier.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
280 : 1978	Mild steel wire for general engineering purposes (*third revision*)
292 : 1983	Leaded brass ingots and castings (*second revision*)
319 : 1989	Free cutting brass bars, rods and sections (*fourth revision*)
410 : 1977	Cold rolled brass sheet, strip and foil (*third revision*)
513 : 1994	Cold rolled low carbon steel sheets and strips (*fourth revision*)
617 : 1994	Aluminium and aluminium alloy ingots and castings for general engineering purposes (*third revision*)
737 : 1986	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes (*third revision*)
742 : 1981	Zinc base alloy die castings (*second revision*)
1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium (*third revision*)
1264 : 1989	Brass gravity die castings (ingots and castings) (*fourth revision*)
1573 : 1986	Electroplated coatings of zinc on iron and steel (*second revision*)
1773 : 1982	Electroplated coatings of brass
2283 : 2000	Nickel silver sheet, strip — Specification (*second revision*)
2704 : 1983	Brass wires for cold-headed and machined parts (*first revision*)
4170 : 1967	Brass rods for general engineering purposes
4231 : 1967	Specification for locks, miller type
4454	Steel wires for mechanical springs:
(Part 1) : 2001	Patented and cold drawn steel wires — Unalloyed (*third revision*)
(Part 2) : 2001	Oil hardened and tempered spring steel wires and valve spring valve — Unalloyed (*second revision*)
(Part 4) : 2001	Stainless spring steel wire for normal corrosion resistance (*second revision*)
4905 : 1968	Methods for random sampling
6527 : 1995	Stainless steel wire rod (*first revision*)
6603 : 2001	Stainless steel bars and flats — Specification (*first revision*)
6911 : 1992	Stainless steel plate, sheet and strip (*first revision*)
7608 : 1987	Phosphor bronze wire for general engineering purposes (*first revision*)
9550 : 1980	Bright bars
10757 : 1981	Nickel silver rods and bars

Bureau of Indian Standards

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